ABSTRACT OF THE DISCLOSURE

A method of multi-resolution adaptive correlation processing of images, such as seeded fluid flow images, to efficiently increase the spatial resolution and dynamic range of detecting particle image displacements in the images. The technique takes full advantage of the multi-resolution characteristic of the discrete correlation function by starting the processing at the smallest scale and if necessary gradually building correlation planes into larger interrogation areas based on the result of inter-level correlation correction and validation. It is shown that the method can be implemented in both direct and FFT based correlation algorithms with greatly reduced computational complexity. Processing the images at the lowest scale (e.g. pixel or particle image size) allows the combination of correlation planes of various shapes both in space and in time for maximizing the correlation plane signal-to-noise ratio or for estimating statistical flow parameters.